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Disaster crises management in Turkey: 1999 Marmara earthquake case

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Abstract

Earthquakes are one of the major disasters that require a holistic approach in crisis management strategies owing to their devastating effects. However, the continuing incapability of some countries learning from earthquakes poses a major policy problem for disaster reduction and response. Up until the Marmara Earthquake, Turkey was one of these countries. This paper examines the conditions and characteristics contributing to the massive 1999 Marmara earthquake that devastated the country in a large scale and resulted in many casualties, never seen before in its history. It also focuses on the response of the government to this earthquake and lessons learnt from the disaster in terms of preparedness as well as processes of mitigation, response and recovery. It tries to explain the conditions that lead to changes in a wide range of areas from insurance of buildings to their construction standards realized by the government in order to reduce its vulnerability to future disasters.

Keywords: Disaster, earthquake, the Marmara earthquake, risk management, disaster management.

I-Introduction

Disasters are abrupt, calamitous and mostly unexpected events that result in great casualty and damage, whether through natural or man-made causes. They take place across the world in every form of natural, man-made or combination of both (Oral & Dönmez, 2010). In general, disasters entail an enormous number of victims and cause a devastating effect on the economies of countries. They also challenge the rapid response ability of the public and the government and require taking sufficient steps so as to manage them effectively.

Response to disasters follows a crisis management cycle that includes specific aspects of a disaster, with an open ended process. There are four phases in this cycle: mitigation, preparedness, response, and recovery. Mitigation comprises a broad range of measures that prevent a disaster, lessens the chance of a disaster occurrence or reduces the detrimental effects of unavoidable

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disasters. Preparedness, as the second phase, implies efforts in increase readiness for a disaster and focuses on ensuring the community is prepared to react to any hazard that endangers the certain location. Response is the activity undertaken just before, during and immediately after a disaster in order to protect life and property. As the last phase, recovery is the action that aims at returning the impacted community to a pre-disaster status or to an improved situation after a disaster. This is a very daunting phase of the crisis management since it entails community as well as personal motivation (AthenaGlobal, 2004).

The crisis management is particularly essential to evaluate susceptibility, danger, risk, and coping ability and strategy through participatory processes, and to achieve consensus within the state institutions on actions required. In the crisis management, mitigation strategies and coping mechanisms may vary from disaster to disaster. These should aim at reducing vulnerability to crisis institutions face with regard to various natural disasters and strengthening their capacity to deal with it. The primary objective of crisis management is to handle a crisis timely and effectively as well as help the government and its agencies curtail the damage caused by any disaster. Additionally, in any crisis management strategy, providing information to the communities via the media is so vital that it helps mobilize their own coping mechanisms to deal with any disaster (Olson & Wu, 2008).

Earthquakes are one of those major disasters that require a holistic approach in crisis management strategies due to their devastating effects. However, the continuing incapability of some countries learning from earthquakes poses a major policy problem for disaster reduction and response. Up until the Marmara Earthquake, Turkey was one of these countries. This paper examines the conditions and characteristics contributing to the massive 1999 Marmara earthquake that devastated the country in a large scale and resulted in many casualties, never seen before in its history (Comfort & Sungu, 2002). It also focuses on the response of the government to this earthquake and lessons learnt from the disaster in terms of preparedness as well as processes of mitigation, response and recovery. It tries to explain the conditions that lead to changes in a wide range of areas from insurance of buildings to their construction standards, realized by the government in order to reduce its vulnerability to future disasters.

II- Turkey and Earthquakes

Turkey is located in one of the most active seismic zones in the world. More than 95 percent of the country's land mass is prone to earthquakes. The areas in which large-scale earthquakes can strike at any time include 75 percent of industrial facilities and 70 percent of the population. Since 1894, direct infrastructure and property losses stemming from earthquakes have normally surpassed

5 billion US dollars and, in the case of the 1939 Erzincan earthquake, have attained $23 billion (Gurenko, Lester, Mahul, & Gonulal, 2006).

On the other hand, although Turkey is subject to frequent earthquakes, most significantly from the North Anatolian Fault Zone, which stretches across the country and is responsible for many of the Turkey's largest historical earthquakes, it was not well prepared for any large scale earthquake causing significant causalities and devastation. The Turkish officials, evidently, knew that in comparison with other natural disasters, earthquakes have always been the most devastating and frequent ones in Turkey. According to the records and statistical figures of the last 70 years, the average annual loss from earthquakes alone amount to 0,8 percent of the national income, whilst the ratio of the other natural disasters is 0,2 percent (Erdik, 1999). Considering the building damages owing to natural disasters in Turkey over the last 60 years, 62 percent of the total loss has been related to the earthquakes (Komisyonu, 1999). Despite the fact that the fault system has been well documented and researched, up until the Marmara earthquake, governments did not pay attention to high probability of a large earthquake in this region (Isbir & Genc, 2006). And also, albeit many cities were devastated by the earthquakes, they, nonetheless, were rebuilt on the same or close locations. According to the data, while 44 percent of the total population of Turkey inhabits in the first degree earthquake zone, 26 percent and 15 percent of the population lives in the second and in the third degree zones, respectively (Özmen, Güler, & Nurlu, 1997). Even Istanbul, which suffered major earthquakes and is now the largest city in Turkey, is also located in the first degree earthquake zone (Isbir & Genc, 2006).

III- The Marmara Earthquake

On August 17, 1999, at about 3:02 am local time, northwestern Turkey, which is called as the Marmara region, was hit by a major earthquake. Lasting for 45 seconds, the earthquake was a 7.4 magnitude on the Richter scale and its epicenter was located in Kocaeli, approximately 70 kilometers from Istanbul. The earthquake also caused a tsunami in the Sea of Marmara that was about 3 meters high (WorldBank, 1999).

An official Turkish report placed the death toll at 18,373. At the same time 48,901 people were injured (Ewing, Kruse, Ozdemir, & Narayana, 2004). Reportedly 2,000 buildings collapsed, 120,000 poorly engineered houses were damaged beyond repair, and 50,000 houses were heavily damaged. The earthquake also left 600,000 people homeless (Comfort & Sungu, 2002).

The Marmara earthquake delivered a heavy blow to the Turkish economy in this densely populated urban and industrialized area of the country. Because of its production and consumption capacity, the Marmara region is very significant to the Turkish economy. The region is the center of

the Turkish oil, textile, automobile, petrochemical, and tire industries and produces 46.7 percent of total industry value added (DIE, 2000). The seven cities hit by the earthquake, Istanbul, Kocaeli, Sakarya, Yalova, Bolu, Bursa, and Eskisehir, comprise 23 percent of the total population of Turkey and generate 33.4 percent of the Turkish GDP (DIE, 2000).

In this context, a myriad of factories and industrial units were hit by the earthquake, including several automotive plants and oil refineries. The Turkish navy headquarters in Gölcük, Kocaeli was also heavily devastated. All of these increased the severity of the loss of life and property. The earthquake caused a subsequent fire owing to a collapse of a tower in a Tüpraş oil refinery, which had over 700,000 tons of oil stored. It took several days to get the fire under control. The earthquake also brought about a considerable damage in Istanbul. Destruction here mainly occurred in the Avcılar district, which is on the fault line that stretches across the Marmara Sea. Avcılar was built on ground mainly comprised of sea soil at the bottom level, which renders this district vulnerable to any earthquake (Reilinger et al., 2000).

Turkey's infrastructure, enterprise sector, social infrastructure, and financial systems were also severely affected by the Marmara earthquake, which particularly hard hit the energy, transport, and telecommunications sectors, due to their high concentration near the epicenter. Besides the 3,400 electricity distribution towers and 490 kilometers of overhead cables that were affected form the earthquake, many kilometers of underground cables were destroyed or damaged. Over 60 kilometers of the Ankara-Istanbul highway, the Gebze-Izmit-Arifiye railroad, and ports and jetties in the area were destroyed. In Adapazari, a main rail factory also collapsed. Damage to pipelines and refineries brought about environmental catastrophe (Gurenko et al., 2006). The indirect economic impact of the earthquake on the private sector as well as financial infrastructure was also significant. Losses stemming from uninsured damage led to many nonperforming loans. Despite the fact that assessment of overall economic cost of the Marmara earthquake vary considerably, both direct and indirect costs were calculated at least 10-15 billion US dollars, an amount that is equal to about five-seven percent of the GDP (DIE, 2000).

IV- Overview of Response Activities after Earthquake

As soon as the earthquake hit, search and rescue activities were conducted by surviving family members and neighbors themselves. Within 24 hours of the disaster, tens of members of AKUT, the Turkish civilian voluntary search and rescue group, initiated search and rescue activities, and various aid teams from 24 countries with approximately a thousand personnel participated within 48 hours. Interestingly, as the most organized institution in the Turkish state structure, the Turkish military did not participate in the first two days of the search and rescue operations in the

disaster area. Having drawn much criticism from the public for being late, the Turkish military began its search and rescue activities with 50,000 troops in the third day yet after the earthquake struck (Mitchell, 2000).

In spite of the fact that the crisis management centre of the Prime Ministry allegedly initiated its emergency response activities in a few-hour period following the earthquake, however, response to the disaster by the officials and relevant agencies in the earthquake area were awfully slow and ineffective. Because of the lack of a comprehensive plan and coordination, which is essential to increasing the effectiveness of aid and assistance in such kind of disasters, delivery of food and water was extremely slow; therefore, large amounts of spoiled bread and other food which was uneaten created huge piles of garbage in the disaster area. Owing to the traffic conditions, in the first and second days highways and main roads were extremely congested. Only in the third day of the earthquake heavy machinery sent by the Turkish government was brought in to help remove the debris. Even though the heavy machinery was provided largely from the stricken north-western region, because of the dire need, some was procured from as far as 600 km away. Considering the chaotic situation on the ground, the Turkish government appealed to the international community to provide humanitarian, recovery and reconstruction assistance to be able to cope with the disaster (Isbir & Genc, 2006).

It should be noted here that although there was a total chaos in the first days of the disaster, it did not occur any noteworthy criminal incident, and the local police was fairly better responsive to the earthquake victims than the other governmental institutional. Immediately following the earthquake, one of the most effective institutions in the earthquake area was the police force. Soon after the disaster, The Turkish National Police (TNP) established a crisis management center in its headquarters. Through its special communication infrastructure, this center was in contact with the local police departments in the disaster area, and assisted the other government departments in communicating with their local units within the quake zone. The TNP was also quick to dispatch additional personnel from other regions of the country to help local police departments provide public order and implement other necessary tasks related to the relief efforts.

V- After the Earthquake: What Went Wrong?

In addition to the vast extent of the damage caused by the earthquake, inadequate planning, lack of experience, resources, and ineffective leadership prevented the efficient initial launching of an emergency response in the form of crisis management activities. So much so that the first several days subsequent to the disaster demonstrated that the government was not able to tackle the disaster in an effective way, and was extremely slow and inefficient in its crisis management efforts

as well as search and rescue activities. Control and authority was very limited at all levels in the first days of the earthquake and as a result, there was a total chaos in the disaster areas. It was even reported that as there was no backup facility for the telecommunication lines between Ankara and Istanbul. The President and the Prime Minister were not be able to be communicate with each other for a four-hour period on the day of the disaster (Isbir & Genc, 2006).

According to the International Federation of Red Cross and Red Crescent Societies , although 50,000 people were rescued from beneath rubble in the first days of the Marmara earthquake, 98 percent of these were rescued by local residents, and this is obviously a stark reminder of how the government was unprepared for a disaster that was so large a scale and could not do its job in terms of search and rescue activities (IFRC, 2003).

A few months after the disaster, an approximately 600,000 people were in a situation of dire and immediate need for shelter, and the approaching winter only exacerbated the problem. In order to provide accommodation for these people, along with private institutions the government set up 80,000 tents, many of which, however, were nothing more than a piece of plastic tied across wooden frames (WorldBank, 2007). The government was caught unprepared once again, and quite similar to the other activities following the earthquake, it displayed its incompetency once again.

Due to all these developments after the disaster, in the first weeks, victims of the earthquake were anxious about what the future would look like for them. Due to the trauma and stress associated with such a catastrophe, they completely lost their confidence in the government' ability to help them. Some people were even terrified of returning to their undamaged homes in the first couple of weeks following the disaster.

VI- Lessons Learned

Following the earthquake, the Turkish government concluded that one of the most important priorities in the area of national catastrophic risk management entailed placing new mitigation policies and measures. This, in turn, provided strong incentives to include improvements in the enforcement of the construction code, and thereby promoting safer construction practices. For this purpose, old legislation relating to construction practices was all amended and a number of new safety conditions were put into practice.

Because the sheer number of people affected by the earthquake was overwhelming, the government embarked on sponsoring the construction of low-cost apartments to provide accommodation for 200,000 people who were left without homes. According to the first estimate, half of the damaged residences, roughly 150,000, could be refurbished and that the cost of repairing

and reconstructing buildings would account for between US$750m and US$1.2b (WorldBank, 2007).

On the other hand, disaster victims were still living in tents ten months later when the government started building the apartments. A total 34,000 apartments were constructed within two years of the Marmara earthquake. All the construction projects were prepared within the structure of a comprehensive program which accounted for US$1.8 billion, and were developed by the World Bank, together with the European Union, the United Nations Development Program, the European Investment Bank, and wide range of the Turkish governmental institutions. Due to its previous assistance in the area of disaster recovery and management with two projects, the World Bank was very instrumental in providing support to Turkey (WorldBank, 2007). According to the new code of construction standards, all types of modern facilities and amenities such as, electricity, sewage systems, natural gas and parking were considered when these complexes were constructed. They were well planned with sidewalks, street lighting and tarmac roads. The apartments themselves have sufficient ventilation to protect inhabitants from extreme temperatures and at the same time benefit from natural light. There are also schools, health centers and grocery stores.

After the Marmara earthquake, the government took action with setting up an important disaster preparedness program. Along with other subjects, this program comprised the training of government staff and volunteers in disaster response, logistics and telecommunications. The government also restocked warehouses with relief shelter and goods, and launched a public education campaign on what to do if an earthquake hits. Because what happened during the earthquake regarding search and rescue activities was in its mind, military formed a new organization within its structure in order to better response emergency calls (Isbir & Genc, 2006).

The wounds needed to be healed not only physically but also psychologically for the survivors of the earthquake. In response to the need of disaster victims for special assistance in overcoming the trauma caused by this devastating earthquake and putting their lives back together, the government set up an important psycho-social support program. The program included the establishment of four centers in the earthquake areas.

Last but not least, the exceptionally high financial costs of the Marmara earthquake induced the government to embrace a more fiscally efficient approach to financing earthquake losses. With this aim the government targeted to realize financial sustainability in the long term, thereby curtailing the government's obligation to afford post-disaster emergency relief to the owners of dwellings. After examining the current international practice with catastrophe insurance funds, the Turkish government decided that the Turkish Catastrophic Insurance Pool (TCIP) should be obligatory for

all homeowners with coverage affordable for most homeowners and with adequate claims-paying capacity to significantly reduce the government's fiscal exposure to catastrophe risk. This required an amendment to Disaster Law No. 7296, under which the government obliged to finance reconstruction of all houses destroyed by natural disasters. The law was amended twice in 1999 and 2001, respectively and thus, the government's obligation to provide housing reconstruction credits for registered urban housing after an earthquake ceased (Gurenko et al., 2006).

VII- Conclusion

The Marmara earthquake presents a rare opportunity to examine what went wrong in response to the disaster and why the relevant governmental institutions as well as officials were not well prepared for such kind of disaster in Turkey, in spite of the fact that geographically a major part of Turkey is located in the earthquake zones and most of its population is settled in these areas.

This disaster also revealed that if the necessary measures had been taken in advance, many lives could have been saved**.** It is obvious that measures that were required to be in practice in order to avoid such catastrophic results were neglected or ignored by the government. Firstly, due to the lack of sufficient control mechanism and enforcement, inadequately designed and constructed buildings were easily collapsed. Secondly, because of the lack of professional teams, there were not sufficient search and rescue activities in the disaster area. Thirdly, a lack of housing insurance mechanism, as a compensation fund for the cost of the earthquake, resulted in a huge financial loss. Fourthly, although the country is located on one of the most active seismic zones in the world, there was no serious disaster preparedness education program in schools. Finally, government authorities and officials caught unprepared for the disaster, and albeit they were in dire need of communication, they were unable to communicate with one another, due to the lack of technical infrastructure.

Having this experience in its mind, since the Marmara earthquake, Turkey has achieved great progress in setting up an important disaster preparedness program in the areas of: promoting safer construction practices and putting a number of new safety conditions into practice; training of government staff and volunteers in disaster response, logistics and telecommunications; launching a public education campaign on what to do if an earthquake hits; restocking warehouses with relief shelter and goods; establishing facilities for special assistance in overcoming the trauma caused by this devastating earthquake; and building its catastrophe reserves and bringing its claims-paying capacity to a level equal to the minimum investment grade rating.

Finally, mobilizing aid to help earthquake victims in the devastated communities in the disaster area entailed essentially the exchange of information within the communities themselves as well as

between the communities and the government in Ankara. In addition, multiple exchanges occurred between the damaged communities and private and nonprofit organizations at local, national and international levels. These exchanges at all levels provided the opportunity to learn experiences for officials that paved the way for analyzing major challenges and therefore, maximizing their abilities for future disasters similar to the Marmara earthquake. Hence, the set of interactions among individuals, groups and organizations participating in disaster response operations subsequent to the Marmara earthquake helped officials adapt themselves to possible future earthquakes in Turkey.

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